VIDEO CAMERA → COMPRESSION CODER → TRANSMISSION CHANNEL

MICROPHONE

DECOMPRESSION DECODER

DISPLAY AND SPEAKER

Fig. 1

REMOTE MEMORY ~ 210

COMPRESSOR ~ 208

FIXED CAMERA 202

470

REMOTE DECODER AND DISPLAY 220

200

204

206

Fig. 2

OBJECT-BASED VIDEO COMPRESSION (OBVC)
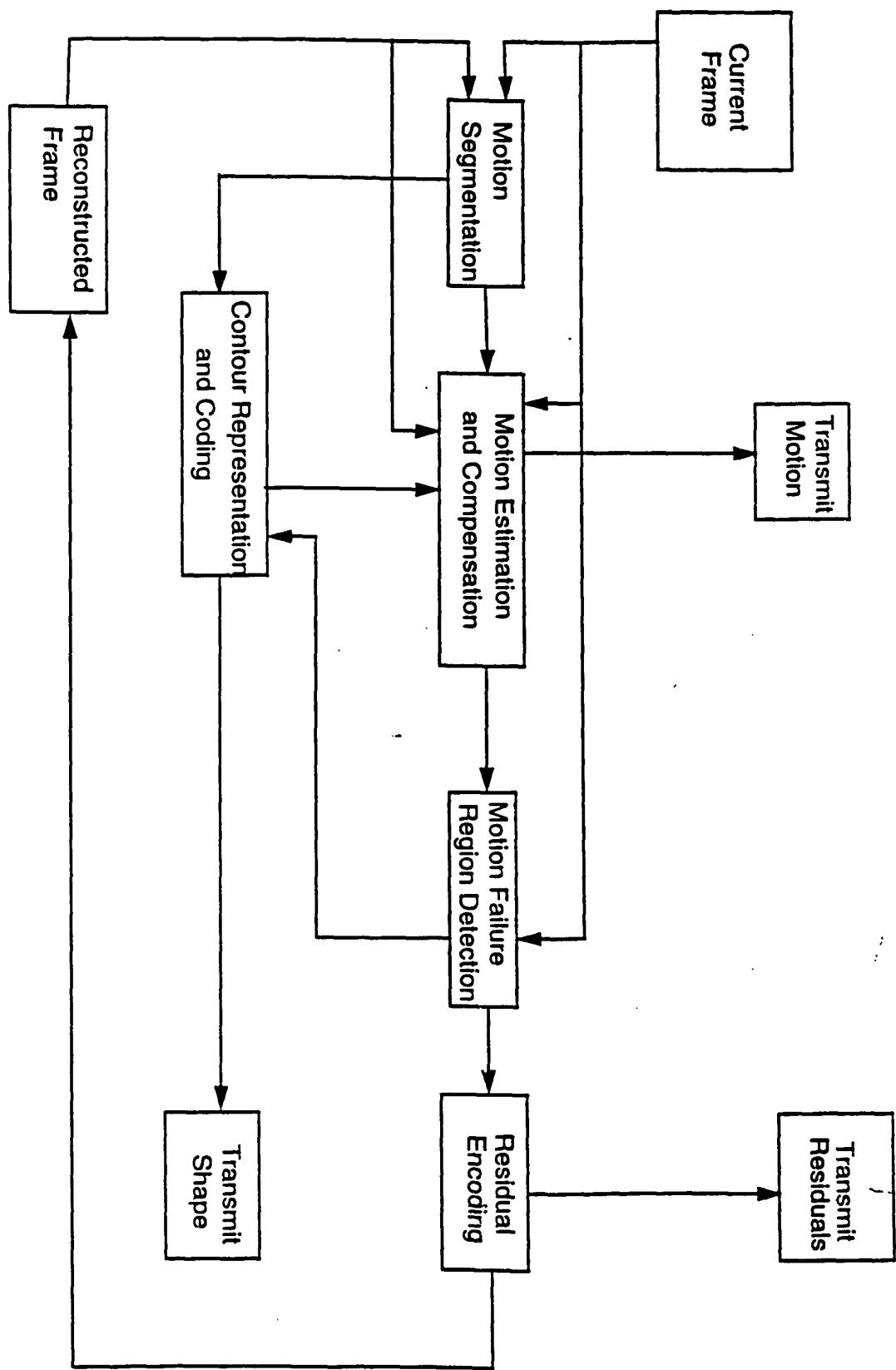
Figure 3

Frame 1

Fig. 4a

Frame 4

Fig. 4b
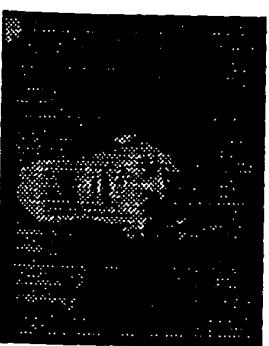
Segmentation
Mask

Fig. 4d

Differences

(completely? ??? = h.f.c.
0 = dark ?)

Fig 4c

Fig

PATENT SKETCH FORM

Attorney_____
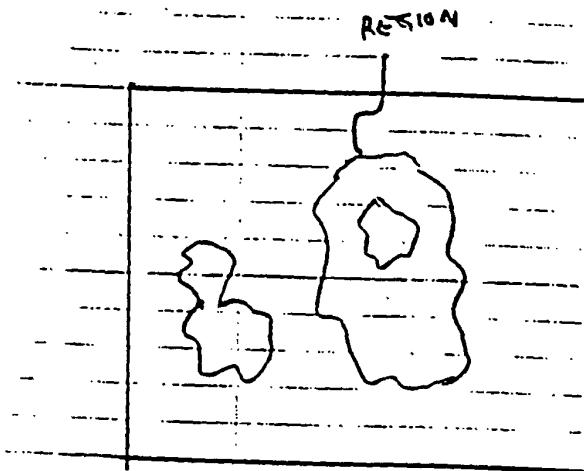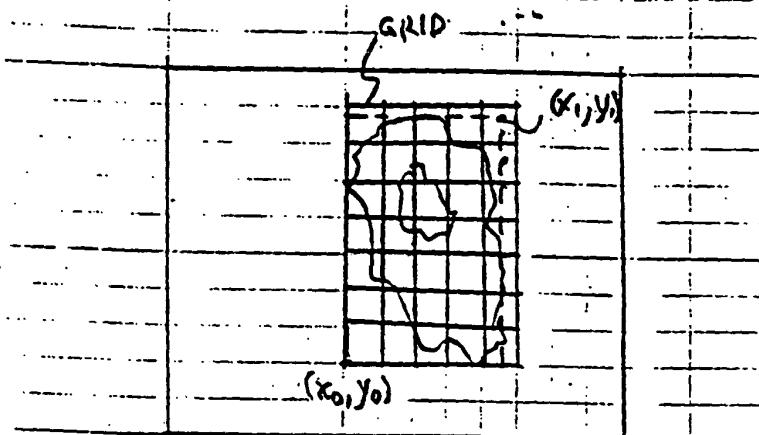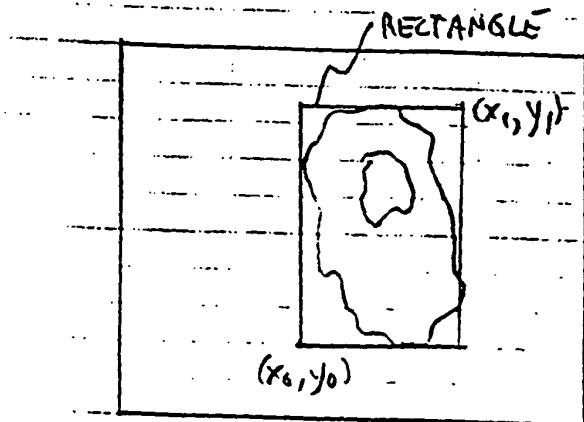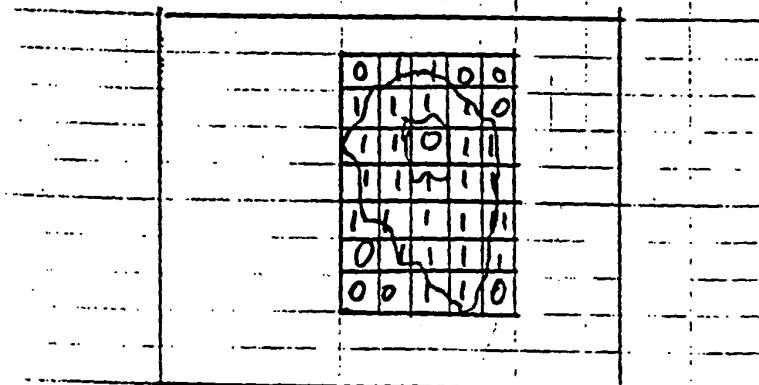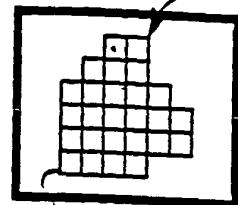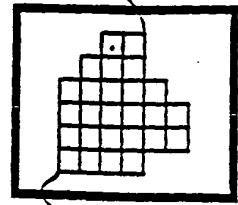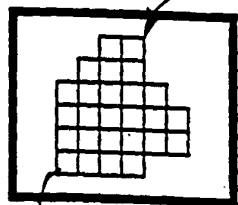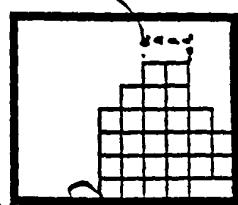
REGION

(x₁,y₁)

GRID

(x₀,y₀)

Fig. 5a

Fig. 5c

RECTANGLE

(x₁,y₁)

(x₀,y₀)

Fig. 5b

0		1	0	0
1	1			0
1	1	0	1	1
1	1		1	1
1	1		1	1
0	1	1		1
0	0	1	1	0

Fig. 5d

(x_0, y_0) n − 1

Fig. 5e

(x_0, y_0) n

(x_0', y_0') n − 1

Fig 5e f

(x_0, y_0) n

(x_0', y_0') n − 1

Fig 5e g

(x_0, y_0) n

(x_0, y_0)

5h

Fig. 5g

Location of Block in Frame N Search Window Motion Shifted Block in Frame N-1

mv

Block in Frame N

Previous Frame N-1

Fig. 6

Actual Frame N
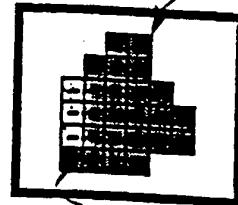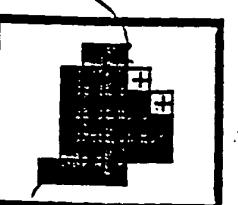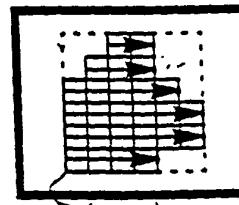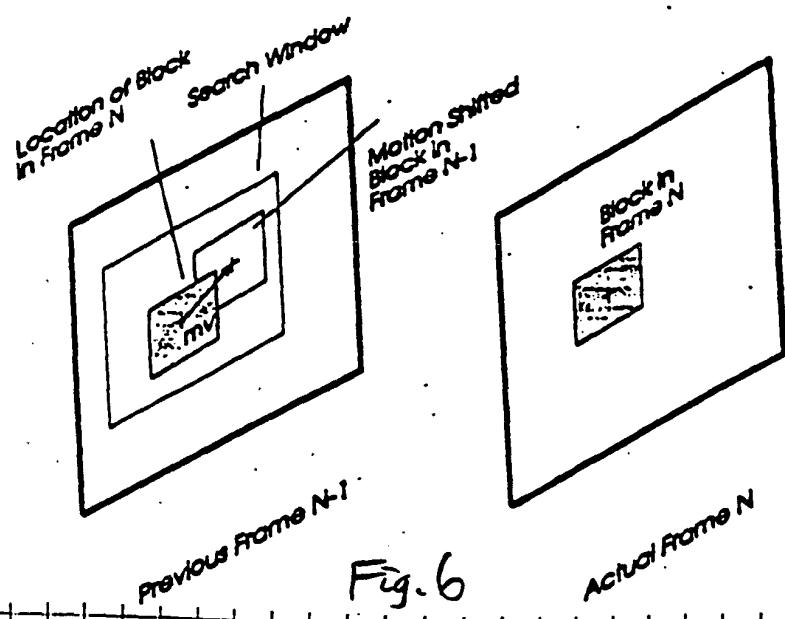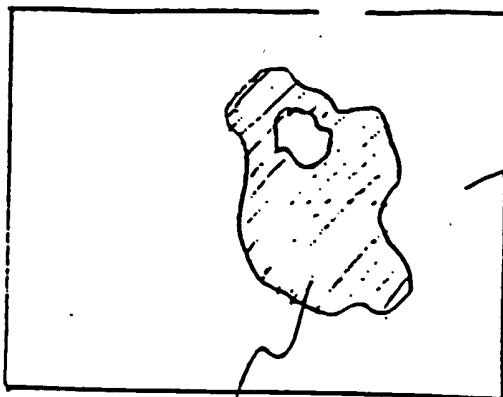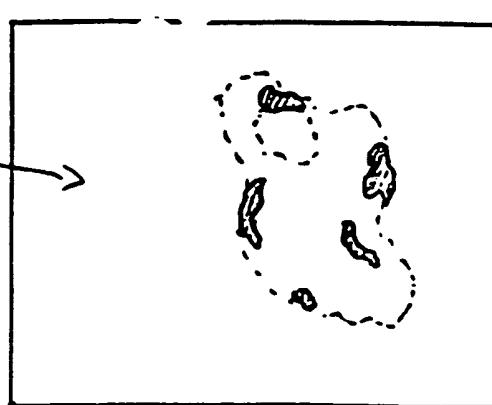
DIFFERENCE
REGION

MOTION FAILURE
REGIONS

Fig.7

(x_0,y_0)

(x_1,y_0)
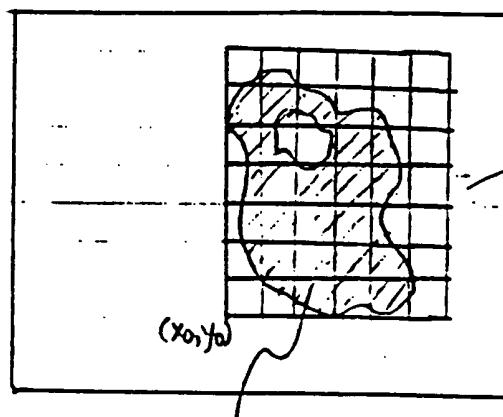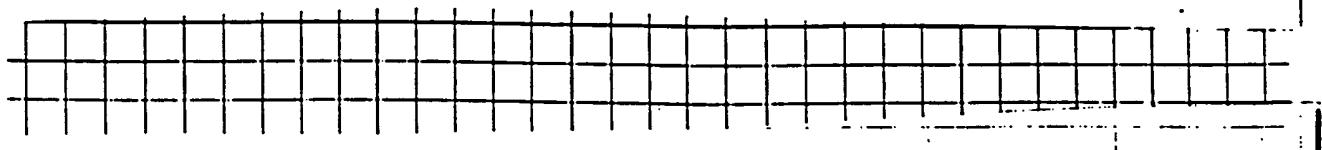
DIFFERENCE
REGION
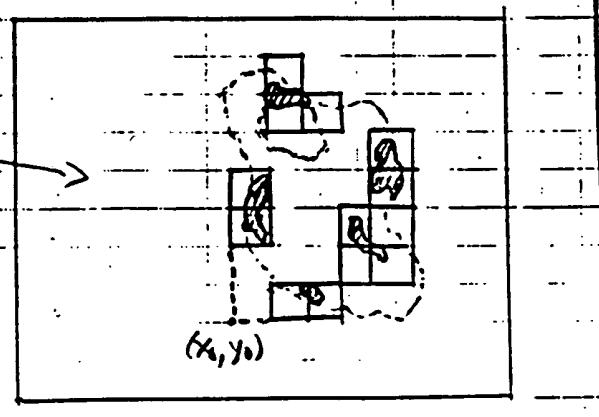
MOTION FAILURE
REGIONS

Fig.8

Fig. 9a

Fig. 9b

Region of interest
to be coded

Subregion of interest
to be coded

Subregion of interest
to be coded

IMAGE

ONE-LEVEL WAVELET
DECOMPOSITION

TWO-LEVEL WAVELET
DECOMPOSITION
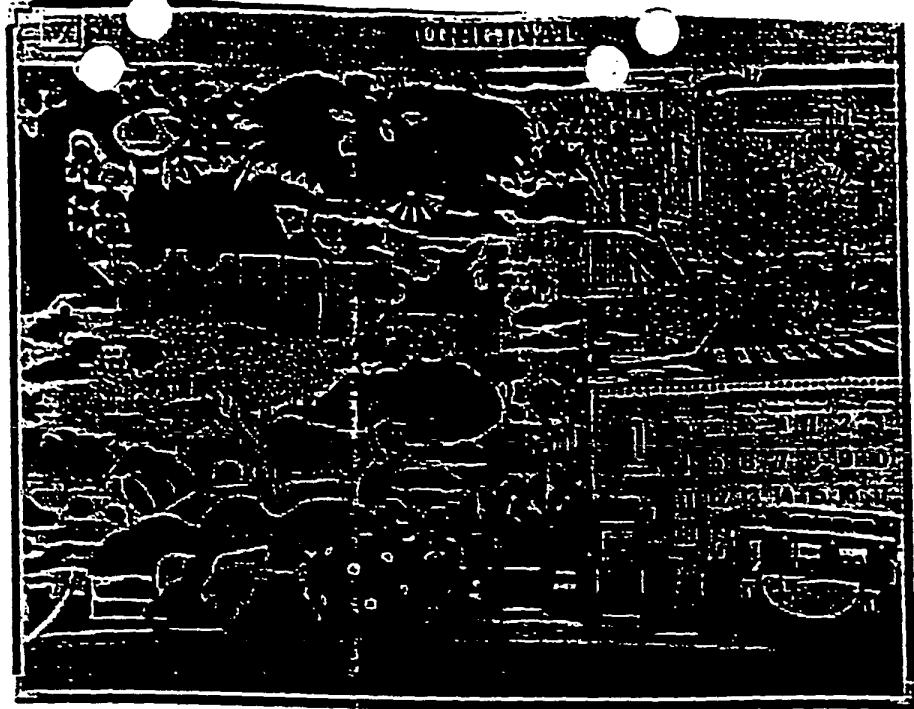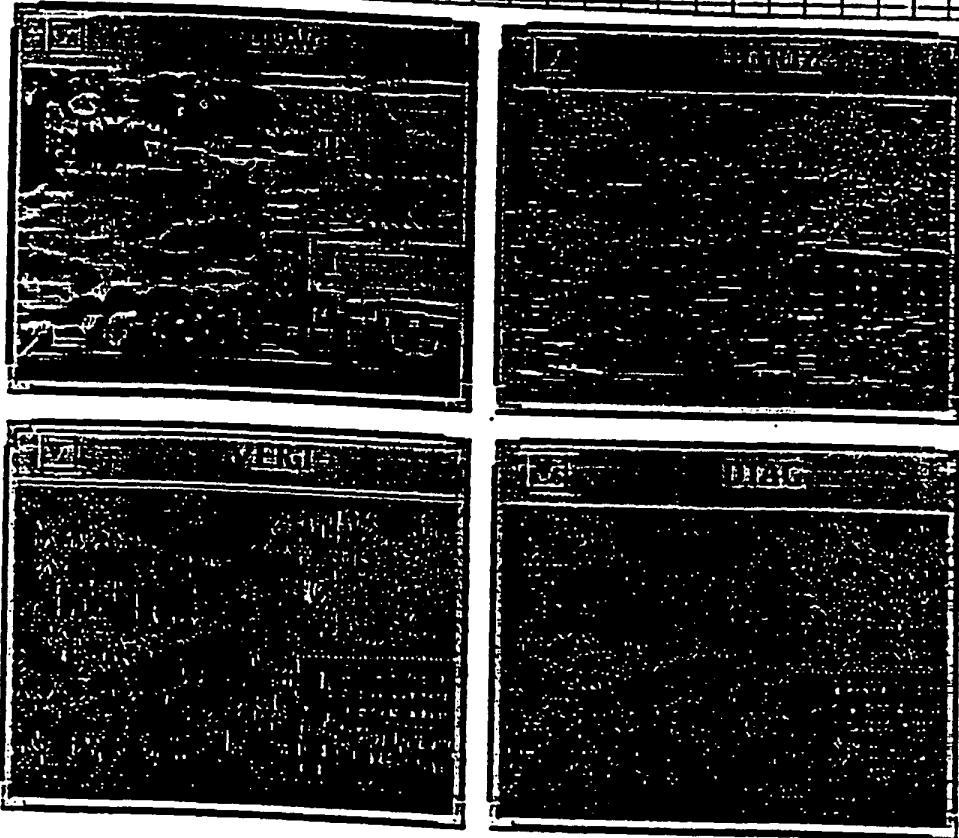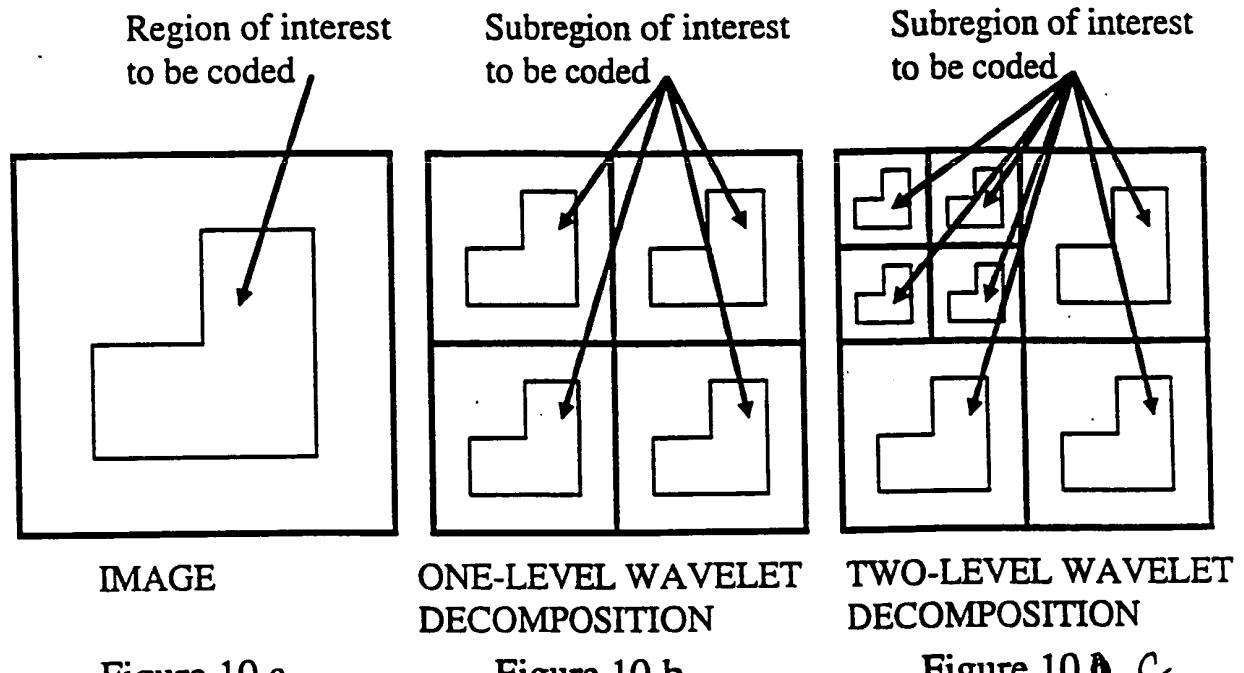
Figure 10 a

Figure 10 b

Figure 10 ⓑ 𝒸

LL3 HL3 HL2 HL1
LH3 HH3
LH2 HH2
LH1 HH1

Fig. 11

Input Video Frames → Motion Compensation Compute Residual → Region of Interest Detection

Transmit Motion Vector Bits →

Transmit Region of Interest Map Bits →

Frame Memory

Add Residual to Prediction

Zero image outside region ← Wavelet Reconstruction ← Quantization and Encoding (zerotree)

Zero image outside region

Wavelet Decomposition

Transmit Quantization Bits →

Output Bitstream

Figure 12

Fig. 13a First frame of video


Fig. 13b Segmentation mask
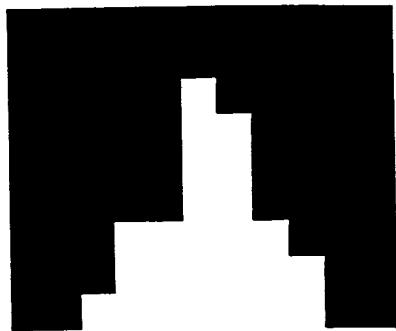

Fig. 13c Blocked mask
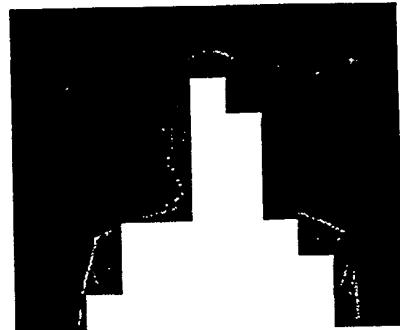
Fig. 13d Extracted background

Fig. 13e Blocked object mask
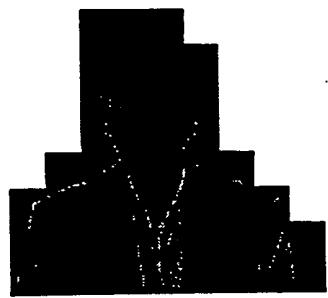
Fig. 13f Extracted object
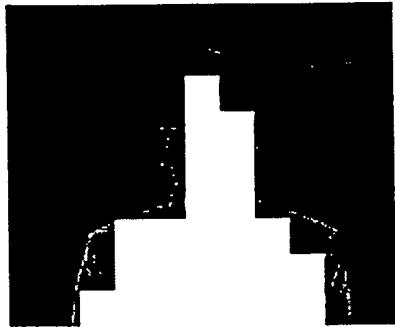

Fig. 13g Recon background object
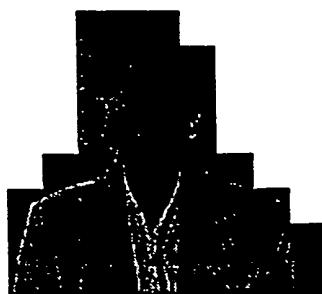

Fig. 13h Recon object

Fig. 13i Recon frame

Fig. 13j Next frame

Fig. 13k Segmentation mask
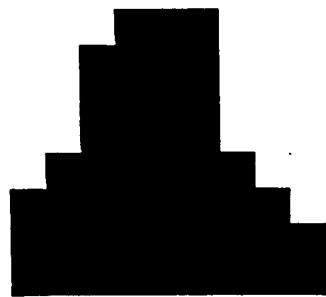
Fig. 13l Blocked object mask
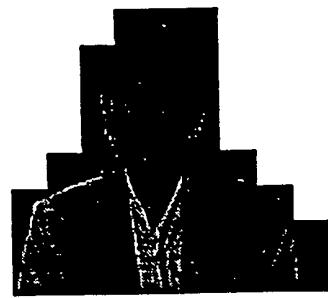
Fig. 13m Extracted object
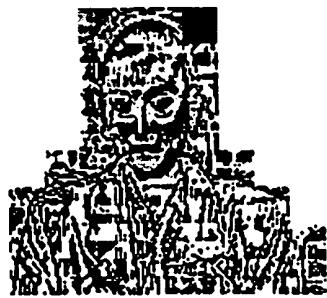

Fig. 13n Object difference
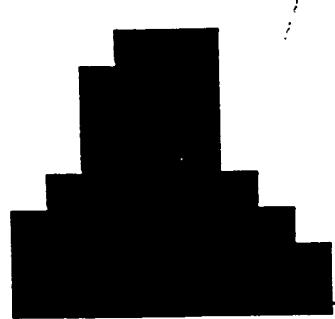

Fig. 13o Adjusted block mask

Fig. 13p Reconstructed object with average background
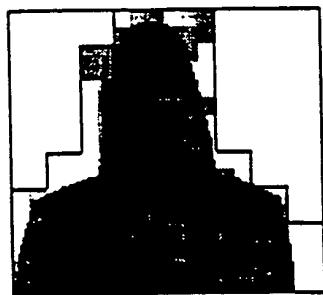

Fig. 13q
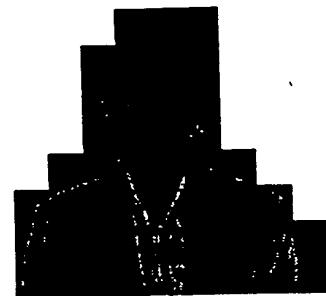
Fig. 13r

DCT coding results; light grey blocks indicate which
blocks were DCT coded.

Fig. 13s Uncovered background pixels   Fig. 13t Mask   Fig. 13u Image

Fig. 13v Recon frame

Fig. 14a Original content

Fig. 14b Object dropped

ENCODER

Fig 15a

DECODER

Fig. 15b

A1 B1

A2 B2

A3 B3

A4 B4

A5 B5

A1 B1 P1

A2 B2 P2

A3 B3 P3

A4 B4 P4

A5 B5 P5

A1 B0 P1

A2 B2 P2

A3 B2 P1

A4 B3 P2

A5 B4 P3

A1 B0 P1 Q1

A2 B1 P0 Q2

A3 B2 P1 Q3

A4 B3 P2 Q4

A5 B4 P3 Q5

A1 B0 P1 Q1

A2 B1 P0 Q2

A3 B2 P1 Q3

A4 B2 P1 Q4

A5 B4 P3 Q5

A1 B0 P1

A2 B1 P0

A3 (B2) (P1)

A4 B3 P2

A5 B4 P3

A-1 B-1

A0 B0 P0

A1 B1

A2 (B2) (P2)

(A3) B3 P3

A-1 B-1

A0 B0

A1 B1

A2 B2

A3 B3

Fig. 16a

A1 B1
A1 B1 P1
A1 B0 P1
A1 B0 P1 Q1
A1 B0 P1 Q1

A2 B2
A2 B2 P2
A2 B1 P0
A2 B1 P0 Q2
A2 B1 P0 Q2

A3 B3
A3 B3 P3
A3 B2 P1
A3 B2 P1 Q3
A3 B2 P1 Q3

A4 B4
A4 B4 P4
A4 B3 P2
A4 B3 P2 Q4
A4 B3 P2 Q4

A5 B5
A5 B5 P5
A5 B4 P3
A5 B4 P3 Q5
A5 B4 P3 Q5

(A2) (B1) (P0)
(A3) (B2) (P1)
(A4) (B3) (P2)
(A5) (B4) (P3) Q5

A0 B0
A1 B1
A2 B2
A3 B3

(P0)
(D1) (P1)
(A2) (B2) (P2)
(A3) (B3) P3

CONNECTION

FEEDBACK

CONNECTED BY FEEDBACK

Fig. 16b